

Preface

As business-to-business interactions via the Internet become more dynamic, new developments in Web services and e-commerce support an increasing number of business transactions. Web services, using standardized software mechanisms and protocols, are self-contained, modular applications dynamically accessible over a network that often provide the capability of facilitating a business transaction. Private trading exchanges and marketplaces promote e-commerce with the use of auctions and other trading methods to conduct transactions over the Internet.

This issue contains 10 papers describing recent developments in Web services and e-commerce. Among the topics are Web services architecture, management, security, and tools. Also discussed are the role of auctions and the IBM WebSphere* product in trading exchanges and marketplaces, as well as interoperability, flexible pricing, and access control used in e-commerce. We are grateful to K. D. Gottschalk of the IBM Software Group in Research Triangle Park, North Carolina, and C. An of the IBM Research Division in Yorktown Heights, New York, for their efforts in obtaining and organizing the papers for the issue.

To be deployed over the Internet, Web services must be based on standards and protocols. In the first paper, Gottschalk et al. present the major concepts and standards for Web services that formulate an architecture and permit interoperable Web services. They then present a scenario describing the application of Web services standards to a business situation.

The Extensible Markup Language (XML) plays a central role in the development of Web services by providing a data interchange format that is independent of programming languages and operating systems.

Lau and Ryman discuss a set of tools that assist developers, allowing them to produce applications for Web services more quickly by minimizing the knowledge required to use XML and other Web-based standards and specifications. These tools are part of the IBM WebSphere Studio Application Developer, an integrated development environment.

Web services are valuable in making business processes accessible to enterprises and their trading partners. The paper by Leymann et al. is a tutorial on the relationship between Web services and business process management. The authors demonstrate the use of workflow technology for specifying how Web services are used to implement activities within business processes, how business processes are represented as Web services, and also which partner performs what part of the business process.

Application management is a well-developed discipline. The reliable and efficient use of Web services requires that the applications supporting Web services be developed to incorporate a management approach. Farrell and Kreger describe how the principles of application management included in the design of an application can be extended to the management of Web services. The characteristics of applications based on Web services must be taken into consideration.

Web services must be secure in order to provide trustworthy business transactions. What the best security measures are for this purpose is yet to be determined. Hondo et al. propose a mechanism for the client to provide authentication data, based on the XML-based description of the function and interface of the service, and for the service provider to retrieve those data. They also show how XML Digital Signa-

tures and encryption can be used to increase security.

Business-to-business (B2B) transactions now have the highest monetary value in e-commerce, and these types of transactions are expected to increase. Sairamesh et al. present a platform that many businesses can utilize to conduct B2B transactions. This platform is the basis for the IBM WebSphere Commerce Suite, Marketplace Edition and the WebSphere Commerce Business Edition. They also relate experience with the Marketplace Edition and its deployment for private exchanges and marketplaces.

As private trading exchanges (PTXs) become more prevalent in e-commerce, their support for multienterprise business processes and rapidly changing business conditions will be important. Kumaran et al. discuss an approach for building PTXs based on a framework that incorporates design patterns for interaction between exchanges and participants. They then describe how the framework was used as a foundation for an application platform, and they explain how the platform can be used to implement PTX solutions.

Because procurement systems and private marketplaces from different vendors use different protocols, suppliers face the challenge of having to support multiple protocols and various interoperability requirements. Dias et al. show how IBM's WebSphere Commerce products can help buyers and suppliers overcome these interoperability problems. The discussion includes simple connectivity for fixed and contract-based pricing, as well as connectivity based on asynchronous processes, such as requests for quotes, auctions, and exchanges.

Business transactions on the Internet have made increased use of flexible pricing. Bichler et al. survey the ongoing work in flexible pricing in the context of the supply chain. Flexible pricing includes both differential pricing, in which different buyers may receive different prices based on expected valuations, and dynamic pricing, in which prices are based on bids by market participants. The survey includes negotiation mechanisms for procurement, strategies in responding to requests for quotes, and pricing in the emerging area of hosted application services.

Because Web sites containing proprietary information from multiple sources are used in e-commerce, control over access to the sites is essential. Good-

win et al. describe a policy-based, resource-level access control scheme and its implementation with the IBM WebSphere Commerce Suite, Marketplace Edition. Their use of implicit groupings of resources and users allows access control policy specifications to be concise and computationally efficient. Performance data are included.

The next issue of the *Journal* will be on aspects of applying the principles of artificial intelligence.

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